

# 2016 Monitoring Summary



## Little Paint Rock Creek at Merrill Mountain Road in Marshall County (34.48465,-86.38622)

### BACKGROUND

Little Paint Rock Creek was selected for post TMDL monitoring, since the TMDL was developed for the two mile length of the stream in 2002. It was listed for impairments caused by high organic enrichment and low dissolved oxygen content causing the stream to be placed on the §303(d) list. The segment was listed as impaired based on data collected in 1994 and 1995.

The Alabama Department of Environmental Management (ADEM) monitored Little Paint Rock Creek at LPRK-1 to make sure the stream segment is meeting its *Fish & Wildlife (F&W)* use classification since the Total Maximum Daily Loads (TMDLs) was developed to address these impairments. A fish community and a habitat assessment were conducted to assess biological conditions on June 22, 2016. Monthly water chemistry samples were also collected March through October 2016.



Figure 1. Little Paint Rock Creek at site LPRK-1, June 22, 2016.

### WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Little Paint Rock Creek at LPRK-1 is a *Fish & Wildlife (F&W)* stream located in Marshall County, near Guntersville. According to the 2011 National Land Cover Dataset, landuse within the watershed is primarily forested (58.6%) and pasture/hay. As of January 1, 2016, ADEM has issued 18 NPDES discharge permits in this watershed.

Table 2. Physical characteristics of Little Paint Rock Creek at LPRK-1, June 22, 2016.

Physical Characteristics	
Width (ft)	5
Canopy Cover	Shaded
Depth (ft)	
Riffle	0.2
Run	0.2
Pool	1
% of Reach	
Riffle	1
Run	1
Pool	98
% Substrate	
Clay	30
Mud/Muck	5
Gravel	10
Silt	20
Organic Matter	35

Table 1. Summary of general watershed characteristics: LPRK-1 (2016).

Watershed Characteristics	
Basin	Tennessee
Drainage Area (mi <sup>2</sup> )	9.7
Ecoregion <sup>o</sup>	71G
Assessment Unit	AL06030002-0204-302
Use Class	F&W
AU Category	4a
12-digit Hydrologic Unit Code (HUC)	060300020204
Conservation Status	
Strategic Habitat Unit †	9 Paint Rock R
Landuse Categories (2011 National Land Cover Dataset)	
Open Water (%)	0.2
Wetland, Total (%)	0.6
Wetlands, Woody (%)	0.5
Forested, Total (%)	58.6
Forested, Deciduous (%)	54.4
Forested, Evergreen (%)	1.1
Forested, Mixed (%)	3.2
Shrub/Scrub (%)	3.3
Grassland/Herbaceous (%)	1.8
Pasture/Hay (%)	26.8
Crops, Cultivated (%)	1.9
Developed, Total (%)	6.8
Developed, Open Space (%)	4.4
Developed, Low Intensity (%)	2.1
Developed, Medium Intensity (%)	0.3
Barren Land (Rock, Sand, Clay) (%)	0.1
Population/km <sup>2</sup> (2010 US Census)	27
NPDES outfalls (NPDES database, Jan 1, 2016)	
Total # of Permitted Outfalls	18
# of Construction Stormwater Permits	14
# of Industrial General	2
# of Mining Permits	2
Roads	
Road Density	1.7
# Road Crossings per Stream km	1.1
Watershed Disturbance Score*	198
Watershed Disturbance Category*	5

<sup>o</sup> Eastern Highland Rim

† 12-digit HUC located in a Strategic Habitat Unit.

\* Measure of watershed disturbance based on landuse, population, and road density summarized in this table.

## REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the fish index of biotic integrity assessment. In comparison with reference reaches in the same ecoregion, they give an indication of the physical condition of the site and the quality and availability of habitat. Little Paint Rock Creek at LPRK-1 is a highly modified, channelized stream with mostly clay substrate and high amounts of organic matter, like sticks and leaf material (Figure 1). Overall habitat quality was rated as *Marginal* considering the poor overall scores in riffle frequency and riparian buffer (Table 3). The majority of the reach (98%) was observed as pool, which means the stream reach is lacking riffle/run complexes. These riffle/run complexes make streams more inhabitable for aquatic organisms, which require this kind of habitat as part of their life cycle.

**Table 3.** Results of the habitat assessment survey conducted on Little Paint Rock Creek at LPRK-1, June 22, 2016.

Habitat Survey	% Max Score	Rating
Instream Habitat Quality	56	Sub-optimal (55-75)
Sediment Deposition	38	Marginal (30-50)
Riffle Frequency	18	Poor (0-25)
Bank Vegetative Stability	61	Sub-optimal (58-73)
Riparian Zone Measurements	10	Poor (0-20)
<b>Habitat Assessment Score</b>	<b>73</b>	
<b>% Maximum Score</b>	<b>41</b>	<b>Marginal (30-50)</b>

## BIOASSESSMENT RESULTS

The fish community in Little Paint Rock Creek at LPRK-1 was sampled using Alabama's Fish Community Index of Biotic Integrity (AL-IBI), developed through a multi-agency (GSA, ADCNR, ADEM) project to establish a comprehensive fish community bioassessment tool for wadeable streams and rivers across the state. The data collected during this survey were to score the overall health of the fish community, based on conditions expected for wadeable streams and rivers in the Tennessee Valley Ichthyoregion. The AL-IBI uses twelve measures of species richness and diversity, tolerance/intolerance, and abundance, condition, and reproduction to assess the overall health of the fish community. The final IBI score is the sum of all individual metrics on a 60 point scale. The IBI score for Little Paint Rock River at LPRK-1 was 30, indicating the fish community to be in *Fair* condition (Table 4).

**Table 4.** Results of the fish assessment conducted on Little Paint Rock Creek at LPRK-1, June 22, 2016.

Fish Assessment		
	Results	Scores
<b>Taxonomic richness &amp; diversity metrics</b>		
Total Native Species	19	5
Number of shiner species	1	1
Number of Sucker Species	0	1
Number of darter+madtom species	3	3
<b>Tolerance metrics</b>		
Number of intolerant species	1	3
Percent of tolerant species	44	1
Percent Lepomis	43	1
<b>Trophic metrics</b>		
Percent invertivores	33	3
Percent omnivores	11	5
Percent top carnivores	1	3
<b>Abundance, Condition &amp; Reproductive Measures</b>		
Percent DELT+hybrids	1	1
Number of lithophilic spawners	10	3
<b>WMB-I Survey Score</b>		<b>30</b>
<b>WMB-I Survey Rating</b>		<b>Fair (29-40)</b>

**Table 5.** Summary of water quality data collected March-October, 2016. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL) when results were less than this value for non-metals parameters. Median, average (Avg), and standard deviations (SD) values were calculated by multiplying the MDL by 0.5 when results were less than this value.

Parameter	N	Min	Max	Med	Avg	SD E
<b>Physical</b>						
Temperature (°C)	7	14.4	24.9	20.3	20.2	4.3
Turbidity (NTU)	7	4.4	15.2	8.2	8.6	3.9
<sup>J</sup> Total Dissolved Solids (mg/L)	5	139.0	182.0	153.0	160.0	17.9
Total Suspended Solids (mg/L)	5	1.0	7.0	4.0	4.6	2.5
Specific Conductance (µmhos/cm)	7	235.0	300.0	272.0	270.0	26.8
Alkalinity (mg/L)	5	115.0	140.0	136.0	128.8	12.2
Monthly Stream Flow (cfs)	10	0.0	17.0	0.3	2.7	5.4
Measured Stream Flow (cfs)	5	0.5	17.0	1.3	5.4	7.0
<b>Chemical</b>						
Dissolved Oxygen (mg/L)	7	5.5	10.9	7.6	7.7	2.1
pH (SU)	7	7.4	7.9	7.7	7.7	0.1
<sup>J</sup> Ammonia Nitrogen (mg/L)	5	< 0.018	0.084	0.029	0.038	0.032
<sup>J</sup> Nitrate+Nitrite Nitrogen (mg/L)	5	0.143	0.343	0.180	0.229	0.090
Total Kjeldahl Nitrogen (mg/L)	5	0.156	0.618	0.300	0.354	0.177
<sup>J</sup> Dis Reactive Phosphorus (mg/L)	4	< 0.004	0.006	0.004	0.004	0.002
<sup>J</sup> Total Phosphorus (mg/L)	5	0.006	0.016	0.011	0.012	0.004
CBOD-5 (mg/L)	5	< 2.0	< 2.0	1.0	1.0	0.0
<sup>J</sup> Chlorides (mg/L)	5	1.6	3.0	2.2	2.2	0.6
Sulfate (mg/L)	5	7.44	24.30	12.70	13.93	6.50
<b>Biological</b>						
Chlorophyll a (mg/m <sup>3</sup> )	5	< 1.00	< 1.00	0.50	0.50	0.00
E. coli (MPN/DL)	5	139.6	1299.7 <sup>H</sup>	235.9	425.3	493.7

E= # samples that exceeded criteria; H= F&W human health criterion exceeded; J=estimate; N=# samples;

## WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected monthly from March through October 2016 to help identify potential stressors to the biological communities. During the months of May through October, the *E. coli* F&W use criteria is 298 colonies/100 ml of sample. During the June station visit, the *E. coli* exceeded this criteria with a result of 307.6 colonies/100 ml of sample.

## SUMMARY

Results of ADEM's 2016 fish community sampling indicated the fish community to be in *Fair* biological condition despite the overall habitat quality being *Marginal*. The highly modified stream channel contributed to the poor scores in the habitat survey and has caused the physical characteristics of the stream to be dominated by pools. The two-mile stream segment of Little Paint Rock Creek, which was originally placed on the §303(d) list at LPRK-1 is meeting its use classification as a *Fish & Wildlife (F&W)* stream with all parameters checked except for *E. coli* in June. Monitoring should continue to ensure water quality standards, habitat diversity, and biological communities remain stable and the stream continues to meet its (*F&W*) designation.

FOR MORE INFORMATION, CONTACT:  
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